

Investigation of an IF under sampling method for the digital TIGER radar receiver

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The proposed IF under sampling method for the digital TIGER radar receiver utilises currently available “slower” high resolution Analogue to Digital Converter (ADC) technology. The analogue to digital conversion is performed after the first IF stage. With the remaining frequency shifting and filtering performed in the digital domain. This method fits well with currently available large-scale FPGA devices, where specialised Digital Signal Processing (DSP) techniques, such as polyphase filtering, can be performed relatively easily. A major challenge is to minimise the noise contribution from aliased frequency bands into the final digital IF stage. This requires the use of high performance analogue filters, which in the proposed system of one receiver per antenna, introduces the problem of phase matching the 16/20 analogue filters. The operation, advantages, disadvantages of the IF under sampling are discussed, analysed and compared with the conventional heterodyne methods. We believe that this is a feasible method for implementation of the digital TIGER radar receiver.